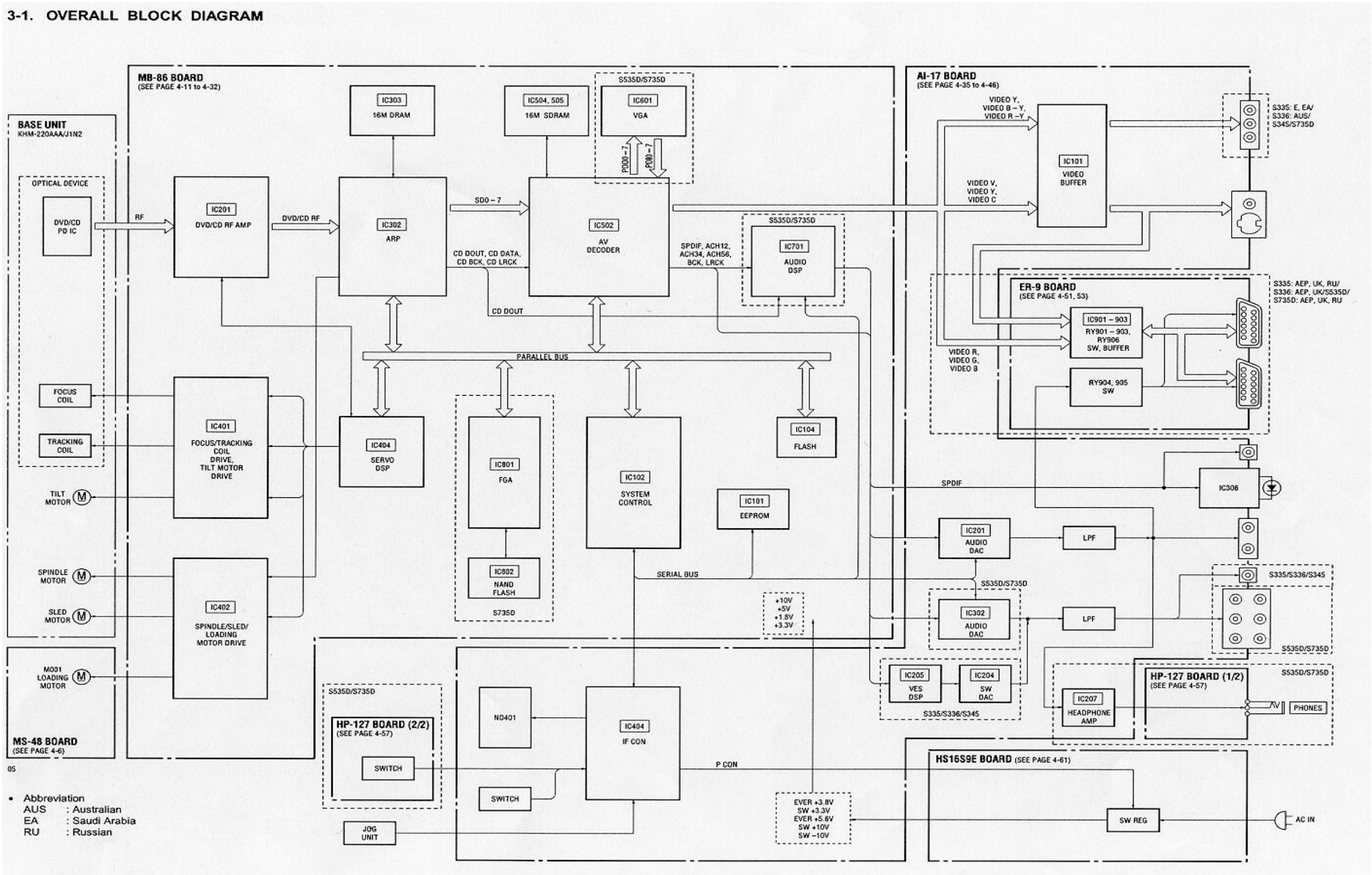
SONY

Training Manual

DVD 4th Generation

Circuit Description & Troubleshooting DVP-S335, DVP-S535D, DVP-S735D

3-1. OVERALL BLOCK DIAGRAM



Overview.

The 4th Generation of Sony DVD players is also called „Slim Line“. The view and design is different comparing to 3rd Generation but they both use the same optical module KHM-220AAA and almost the same loading mechanism. Comparing electronic design we can find that both Generations are very similar. Major differences are located in the Power Supply block, design of PCB (lower number of boards) and types of used ICs.
The way of working is exactly the same as it was in 3rd Generation so in this material only main differences will be included.

Block Diagram

There are also four major stages within this DVD player. They operate in this sequence to produce the discs' video and audio:

- Power Supply
- Communications
- Servo Control
- Video and Audio Processing

Power Supply

Comparing to 3rd Generation here Power supply block is equipped with mechanical power switch and don't have separate standby transformer. After switching on mechanical power switch, switching power supply works all the time. Difference between Standby and Power On mode is only in blocking output of three switching output voltages (SW+3.3V, SW+10V, SW-10V). The power supply block delivers five different voltages at all. Ever 3.8V and Ever 5.6V (E+3V; E+5V) are the only voltages which are present when the unit is in the Standby mode. E+3V powers interface IC404 to switch on the remainder of the voltages when it receives the power ON (P Cont) command.

Communications

Mechanical switch on

After switching on SW101, interface IC404 powers on the unit for 1.3 seconds, keeping the display dark. During this time there is a brief communication between IC404 and system control IC102 on the serial bus. The front panel red standby light is on during the entire initial communication, never turning green when momentarily powering up at switch on. After proper initialisation set is displaying blinking STANDBY word an the display for a few seconds.

Power ON

At power ON, the red standby light turns to green and the output voltages are turned on. After another brief communication between IC404 and IC102, IC102 retrieves and implements the start up program stored in Flash Memory IC104. The start up program requires IC102 to check for the presence of these five ICs on the parallel bus and IC701 on the serial bus: If an IC does not reply, IC102 instructs IC404 to power off the set.

Servo Control

At the successful conclusion of the start up program, IC102 retrieves servo parameter data from EEPROM IC101 using the serial bus. Servo IC404 is instructed to reset the base unit mechanism to the initial position
and confirm it:

· Tray closed

· Tilt servo at mid position

· Sled returned to home position

If the initial position is not confirmed before a time limit ("time out"), IC404 will power off the set. Confirmation comes from IC404(Servo) to IC102. IC102 then sends commands back to servo IC404 for disc detection.

Video and Audio Processing

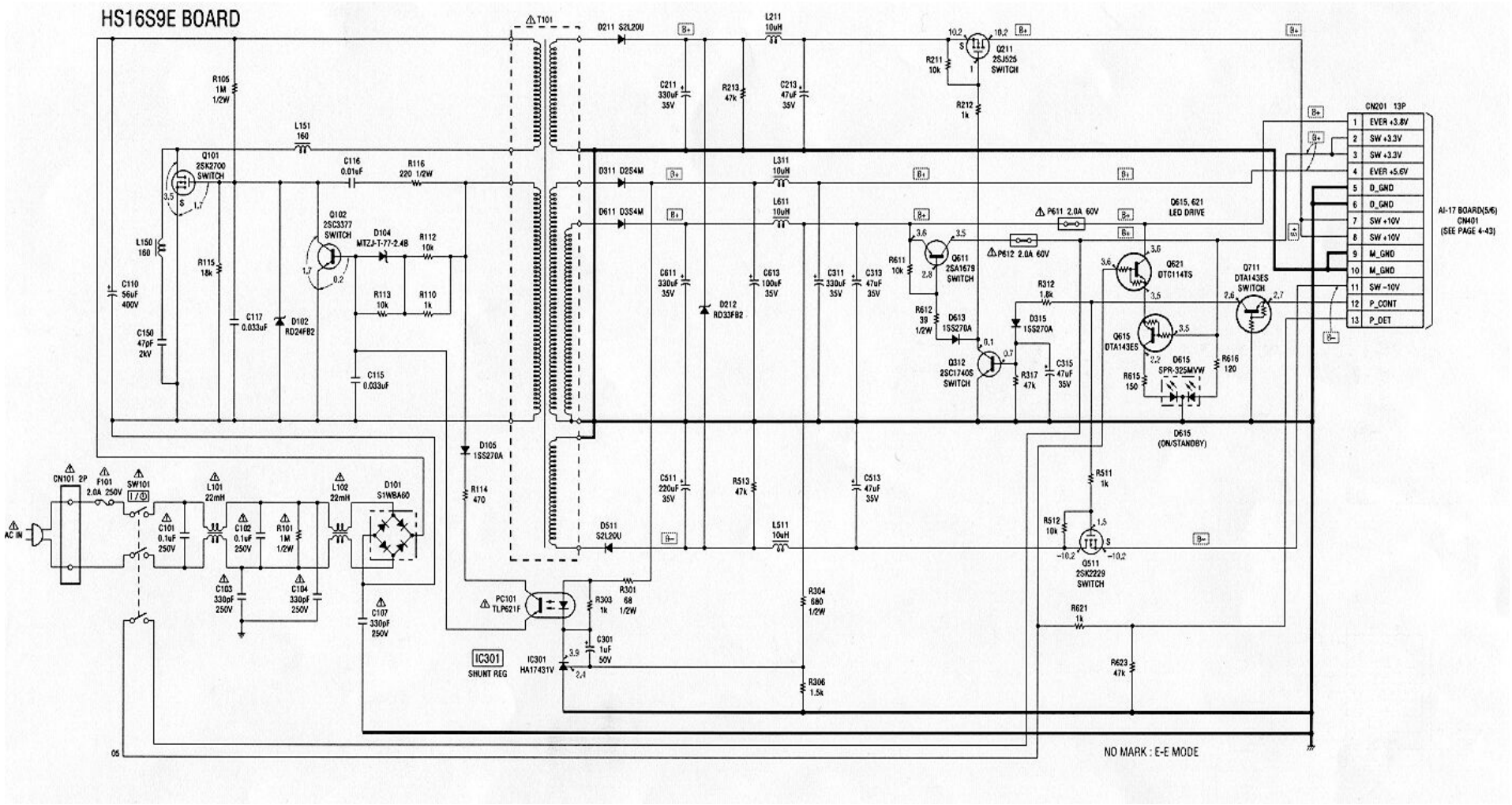
After the servos have begun, RF data will come from the optical assembly within the base unit. The "eye pattern" RF data is split into two paths to provide:

1. Feedback signal to lock the servos; and
2. Video and audio information.

The A/V processing chain is similar to one used in 3rd Generation

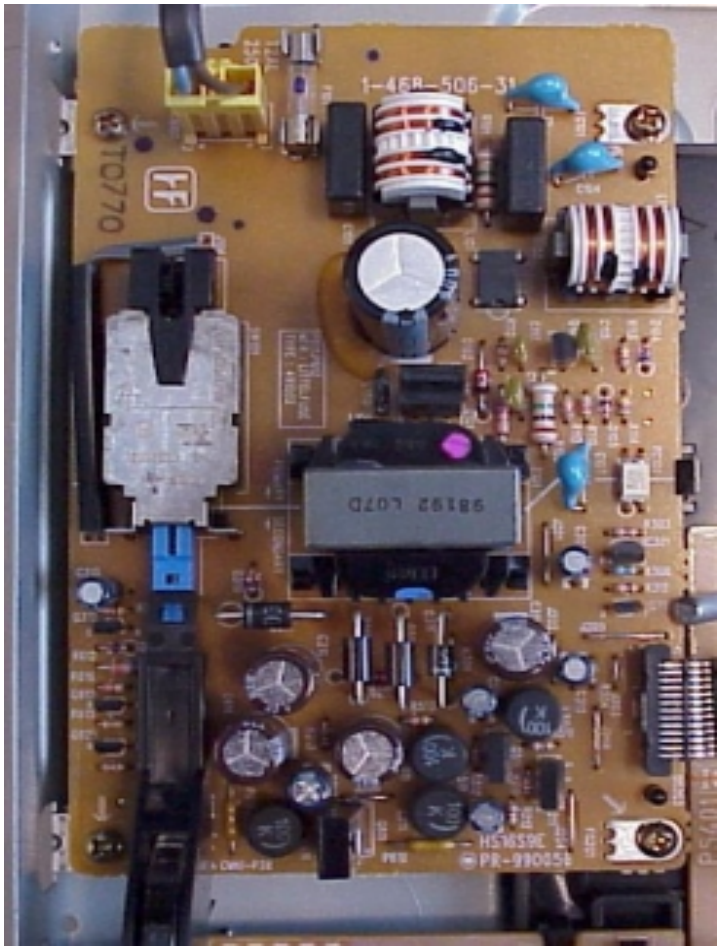
Power Supply Block

The power supply is on a single board (HS-16S9E) located to the left of the DVD mechanism. This board contains mechanical power switch and main power supply.



Main Power Supply

Unlike to 3rd Generation, Power supply of 4th Generation is not so complicated and doesn‘t have separate Standby Power Supply. After moving SW101 to On position Main Power Supply works all the time. During standby mode three from five secondary voltages are blocked
This power supply produces all the time following voltages Ever 3.8V (E+3V) and Ever 5.6V (E+5V). E+3V is supplied to interface IC404 (AI -17 board), the mute transistors (AI -17 board) and E+5V for the IR receiver. The power supply consists of an oscillator and an error regulator. The oscillator consists of switch Q101 and a control transistor Q102. The oscillator output is applied to T101. T101’s secondary voltages are rectified to five output DC voltages.



Regulation

The E+3Vdc output is used to regulate the main power supply. The Ever 3.8V voltage regulation circuit uses:

- IC301 – error detector
- PC101 – photocoupler
- Q102 – control transistor.

IC301 samples the E+3V output and produces a correction voltage. Photocoupler PC101 passes the error voltage from the cold ground circuit to the hot ground side circuit. The control transistor Q102 receives the error voltage and uses it to alter the gate bias of switch Q101. The change in bias alters the off time of the oscillator signal. This changes the oscillator frequency. The changes in frequency affect the efficiency of the transformer, which regulates the E+ 3V.
Remain three output voltages are switched ON by PCONT signal from the Interface IC404/PIN66 on the AI-17 board. A “H“ at P-CONT enables output DC voltages via switch Q711 and Q312. Only supply voltages E+3.8V and SW+3.3V are fused.
Note: When a shorted e.g. spindle motor driver IC402 loaded the unfused +10V supply line, the main oscillator quit! The oscillator worked again when the short was removed.

Other blocks.

Descriptions related to other blocks are in general very similar to ones from 3rd Generation material but you always have to keep in mind that IC used in 4th Generations are slightly different, so reader should carefully check reference numbers of ICs and its related pins numbers.

This manual is based on the DVD-03 training course of:

SONY

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